5. SPRINKLER SYSTEMS

5.1. INSTALLATIONS

Sprinkler system installations must have a reduced pressure detector assembly Hersey Model 6 CM-RPDA or a Watts 909 RPDA, bronze or epoxy coated, installed in the main line.

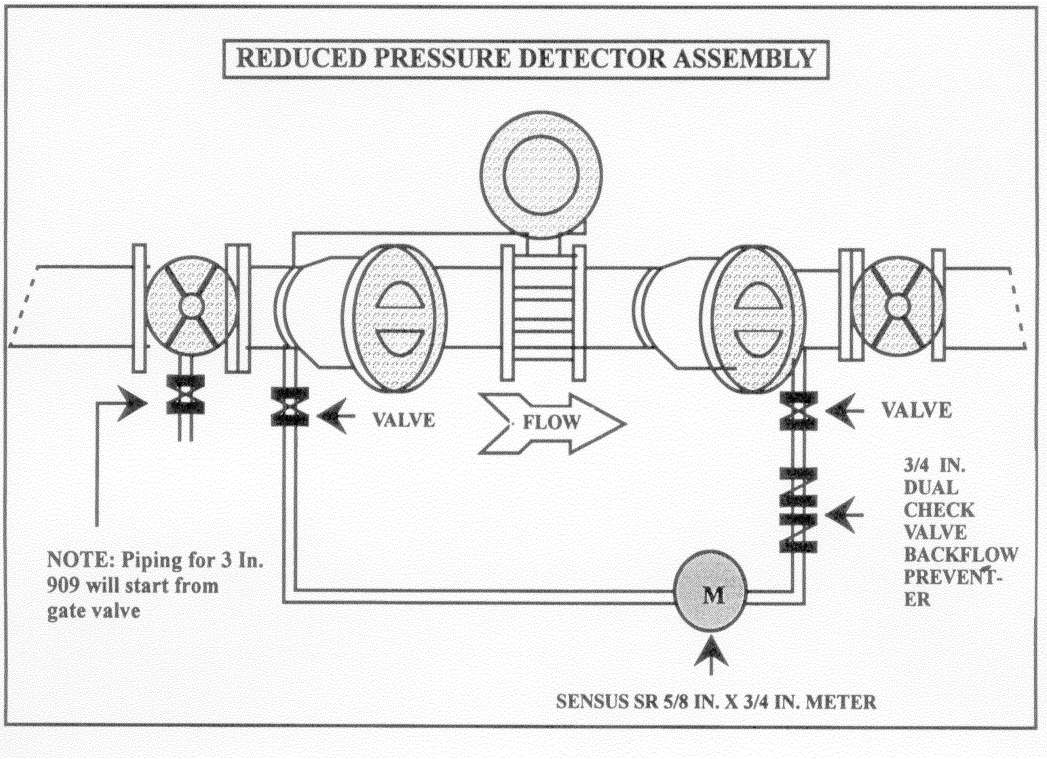
A Sensus SR 5/8" x 3/4" meter must be installed across the check valve and routinely read to detect any unauthorized usage on the sprinkler line. This meter will be installed, read and billed at the minimum rate only, at the customer's expense.

A complete set of drawings of a proposed sprinkler system installation must be submitted to the Department of Waterworks for approval.

All taps, tie-ins and installations will be made at the customer's expense.

Policy: 9-9-1980
Revised: 3-13-1997

5.2. DIAGRAMS



REDUCED PRESSURE DETECTOR ASSEMBLY MUST BE INSTALLED A MINIMUM OF 24" ABOVE GROUND GRADE.

DETECTOR CHECK VALVE: **HERSEY MODEL 6 CM-RPDA**
OR
WATTS MODEL 909RPDA
BRONZE OR EXPOXY COATED
FLANGED ENDS
INSTALL
HORIZONTALLY

DUAL CHECK VALVE: **ONE WATTS MODEL 7 DUAL CHECK VALVE BACKFLOW PREVENTER**

Hersey® PRODUCTS

Model 6CM-RPDA

Reduced Pressure Detector Assembly
Sizes 4″–6″–8″–10″

FEATURES

Exclusive Aergap® system protection.

Hot-dipped galvanized or epoxy-coated cast iron body.

Smooth transition from low to high flow rates.

Replaceable seats and springs.

Rugged one piece body construction for long dependable service.

Standard OS&Y gate valves.

In-line maintenance.

Test cocks for in-line field testing.

Internal sensing passage.

Approval by: USC

DESCRIPTION

Offering the combined features of a reduced pressure backflow prevention assembly and a detector check, the Hersey Model 6CM-RPDA helps control cross-connections that present a health-hazard, while also detecting leakage or unauthorized use of water.

The mainline unit consists of two independent spring loaded, poppet-type, check valve assemblies, and a relief valve, all mounted in a common body. The relief valve is a diaphragm actuated, spring loaded assembly. Two gate valves (OS&Y standard) and four test cocks for field testing complete the basic features of the mainline unit.

The bypass consists of an approved reduced pressure assembly, two shutoff valves, four testcocks, and a meter with low flow accuracy.

OPERATION

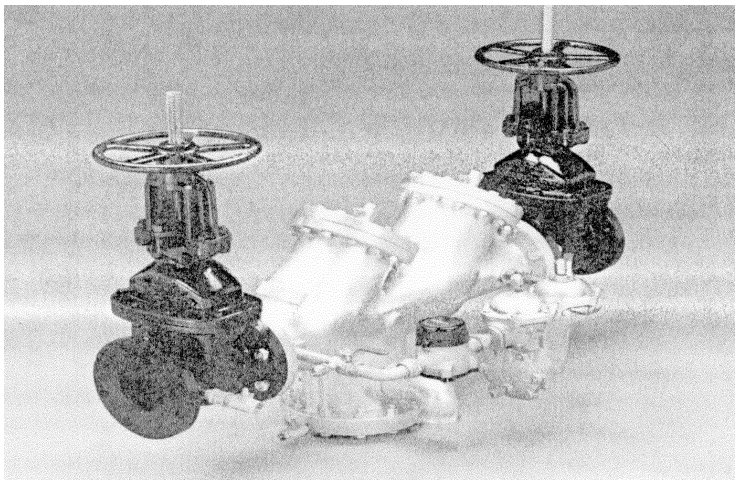
Normal operation - The independent, spring loaded check valves remain closed until there is a demand for water. Low flow is routed through the bypass, and volume recorded on a Hersey Positive Displacement Meter. The relief valves on the mainline and the bypass remain closed because of the differential between the supply pressure and the reduced pressure in the zone between the check valves.

Backpressure - In the event pressure increases downstream, tending to reverse direction of flow, both check valves in the mainline and the bypass are closed to prevent backflow. If the second check valve in either the mainline or the bypass is prevented from closing tightly, leakage into the reduced pressure zone increases pressure and will cause the relief valves to open.

Backsiphonage - If the supply pressure drops to atmosphere or lower than the reduced pressure zone, the relief valves in the mainline and the bypass will open, creating an internal air gap in both assemblies.

APPLICATION

For use at cross-connections when the danger from backflow presents a health-hazard. A primary application is installation in fire lines to detect leaks or unauthorized use of water.

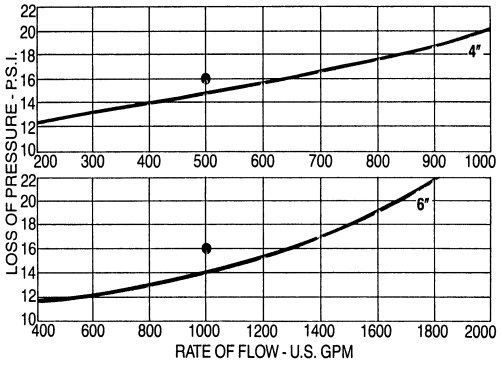


Model 6CM-RPDA

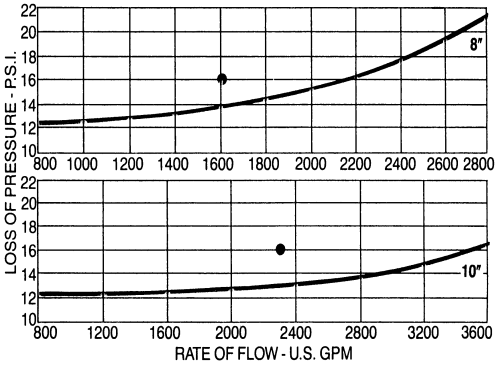
Reduced Pressure Detector Assembly

PERFORMANCE (Performance curves are typical only and not a guarantee of performance)

Head Loss - 4″ and 6″



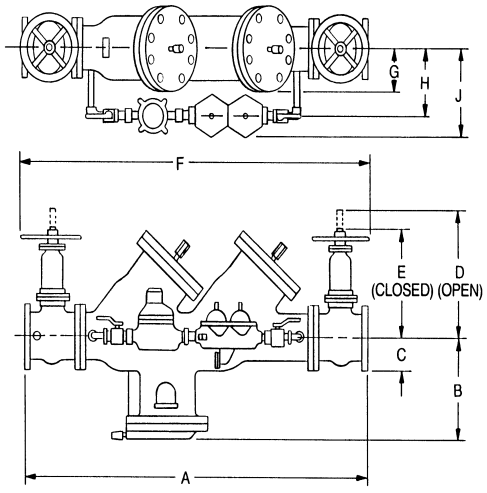
Head Loss - 8″ and 10″



Note: • Maximum Allowable Pressure Loss allowed by USC at indicated flow.

DIMENSIONS

SIZE	4″	6″	8″	10″
A	47 1/2″	62″	75 1/2″	88″
B	10 3/4″	12″	21 1/4″	22 3/8″
C	4 1/2″	5 1/2″	7″	8 1/2″
D	25″	32 3/4″	41 1/2″	48 1/2″
E	20 3/4″	26 1/2″	32 1/2″	38″
F	48 3/4″	63 7/8″	78 1/4″	91 1/4″
G	5 1/4″	6 1/4″	8 1/2″	10 1/4″
H	10 5/8″	9 1/2″	11″	13″
J	13 3/8″	12 1/2″	13 3/4″	15 3/4″



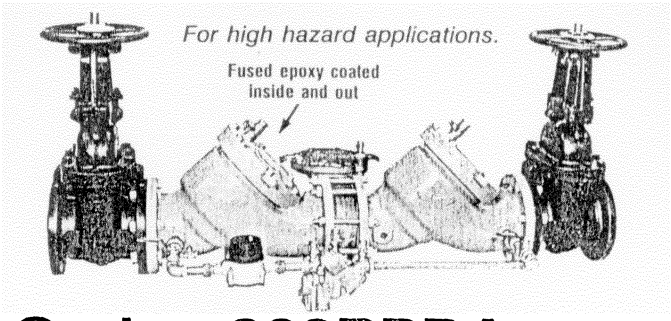
WEIGHT

SIZE	4″	6″	8″	10″
Net Wt.	510	920	1850	2880
Gross Wt.	580	1075	2050	3200

MATERIALS AND SPECIFICATIONS

Mainline body ..... hot-dipped galvanized or epoxy-coated cast iron.
Bypass body (FRP II) ..... bronze
Bypass meter ..... Hersey Positive Displacement Meter
Working parts (mainline) ..... bronze and stainless steel
Springs (mainline) ..... stainless steel*
Diaphragms (mainline) ..... reinforced elastomer
Check and relief valve discs (mainline) ..... silicone rubber
Maximum rated working pressure ..... 175 psi
Hydrostatic test pressure ..... 350 psi
Temperature range ..... 33° - 100°F

*8″ and 10″ mainline, springs are carbon steel vinyl-coated.



Series 909RPDA Sizes 3'' to 10''

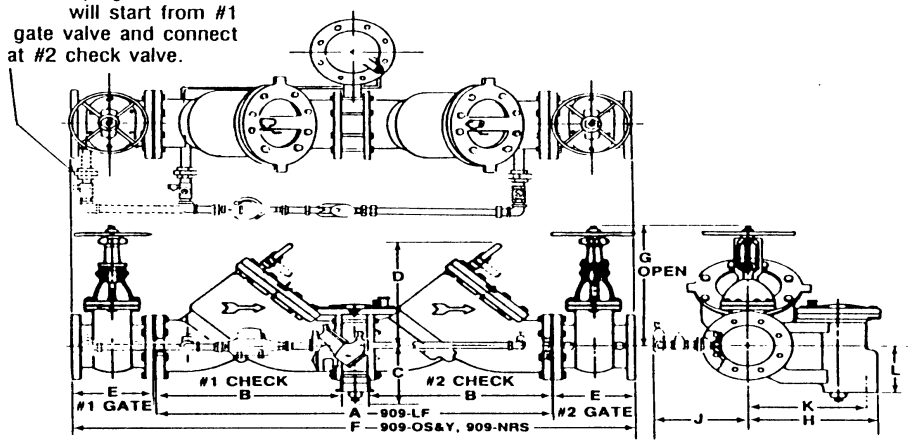
Reduced Pressure Detector Assembly for Fire Protection System Supply Mains

Designed exclusively for use in accordance with water utility authority containment requirements. Used to prevent the backflow of non-potable fluids into the potable water supply system and detect system leaks or unauthorized use water supply. Suitable for supply pressures up to 175 PSI and water temperatures to 110°F maximum. Furnished with UL/FM listed outside stem and yoke (OS&Y) resilient-wedge gate valves and bronze body ball valve test cocks.

- **Fused epoxy coated cast iron body**
- **Furnished with bronze 5/8'' x 3/4'' recordall CFM meter, Model 25**
- **No special tools required for servicing**
- **Captured spring assemblies**

OPTIONS (Suffix):
GPM - with gallons per minute meter
LF - without shut-off valves

Note: Piping for 3'' 909 will start from #1 gate valve and connect at #2 check valve.



Size (Inches)	DIMENSIONS (Inches) A	B	C	D	E	F	G	H	J	K	L	Weight (lbs.)
3''	26 1/8	12	5 1/4	7	8	42 1/4	18 1/2	9	14	7 5/8	4 1/4	230
4''	37	17	6	9 1/2	9	55 1/8	23 3/4	13 5/8	15	11 3/4	5 7/8	470
6''	44 1/2	20 3/4	6	14 1/2	10 1/2	65 1/2	32 1/2	13 5/8	16	11 3/4	6	798
8''	55 1/4	26	9 3/4	18 1/2	11 1/2	78 3/4	39 1/4	18 1/2	17	16 3/8	8 5/8	1456
10''	67 1/2	32	9 3/4	21 1/2	13	93 5/8	48	18 1/2	18	16 3/8	8 5/8	2230

5.3. ANTI-FREEZE PROTECTION

DEPARTMENT OF HEALTH
NEW ORLEANS, LA 70160
Bulletin 1969-1 January 8, 1969

SUBJECT: Building Fire and/or Sprinkler Systems Chemical Anti-freeze Protection

FROM: James F. Coerver, Head
Division of Engineering
Louisiana State Department of Health

TO: Waterworks Superintendents and
Plumbing Inspection Departments

The possibility has recently been brought to our attention that toxic materials may be in use as freeze protection to building fire and/or sprinkler systems. These systems are normally connected directly to the public water facilities and therefore the use of any toxic materials therein would jeopardize the public water facilities as well as the potable water piping of the building.

It is our understanding that etheylene glycol Is being used In some systems. The extensiveness of its use is not known. Etheylene glycol is the chemical commonly used in automobile radiators as "permanent" type antifreeze. It is highly toxic.

We have generally accepted the National Fire Protection Association's recommendation as cited In their bulletin #13 as regards the use of antifreeze in building sprinkler systems. A summary of these recommendations follow:

1. Where the building fire and/or sprinkler system Is tied directly Into the potable water facilities without any protection against backflow, no chemical additives for freeze protection is acceptable.
2. Where the building fire and/or sprinkler system Is tied directly Into the potable water facilities with a check valve provided for backflow protection, the following freeze protection chemicals can be used:
    1. Glycerin U.S.P. food grade, or;
    2. Propylene Glycol

It Is recommended that your department survey building fire and/or sprinkler systems served by your water facilities to assure that unapproved chemicals are not being used and that check valves are provided on those systems where acceptable chemicals are being used.

cc: Parish Health Units
Regional Health Offices

6. WATER MAIN DEFLECTION

6.1. PIPE DEFLECTION

Pipe joint deflection shall not exceed 75% of the manufacturer's recommended allowable.

6.2. DIAGRAMS / CHARTS

PVC PIPE — DESIGN AND INSTALLATION

Table 13
Allowable Longitudinal Bending for Pressure Class Pipe
(AWWA C900, CI Size) in 20 ft Lengths at 73.4°F (23°C)
(Cell Class 1245B, PVC 1120, S_b = 800 psi, E = 400,000 psi)

Nominal Size *in.*	4	6	8	10	12
DR 14 (PC 200)					
D_o, in.	4.800	6.900	9.050	11.100	13.200
t_{nom}, in.	0.364	0.523	0.685	0.841	1.000
D_i, in.	4.072	5.854	7.680	9.418	11.200
I, $in.^4$	12.562	53.62	158.5	385.4	717.9
M, in. lbs.	4,187.0	12,434.0	28,021.0	55,552.0	87,018.0
R_b, in. (min)	1,200.0	1,725.0	2,263.0	2,775.0	3,300.0
R_b, ft. (min)	100.0	144.0	189.0	231.0	275.0
β degrees	11.5	8.0	6.0	5.0	4.2
α degrees	5.7	4.0	3.0	2.5	2.1
A, in.	24.0	17.0	12.0	11.0	9.0
P, lbs.	30.0	80.0	170.0	370.0	560.0
Ratio R_b/D_o	250.0	250.0	250.0	250.0	250.0
DR 18 (PC 150)					
D_o, in.	4.800	6.900	9.050	11.100	13.200
t_{nom}, in.	0.283	0.406	0.533	0.654	0.777
D_i, in.	4.234	6.088	7.984	9.792	11.646
I, in^4	10.28	43.83	129.8	293.9	587.3
M, in. lbs.	3,426.0	10,163.0	22,947.0	42,363.0	71,187.0
R_b, in. (min)	1,200.0	1,725.0	2,263.0	2,775.0	3,300.0
R_b, ft. (min)	100.0	144.0	189.0	231.0	275.0
β degrees	11.5	8.0	6.0	5.0	4.2
α degrees	5.7	4.0	3.0	2.5	2.1
A, in.	24.0	17.0	12.0	11.0	9.0
P, lbs.	20.0	70.0	140.0	280.0	460.0
Ratio R_b/D_o	250.0	250.0	250.0	250.0	250.0
DR 25 (PC 100)					
D_o, in.	4.800	6.900	9.050	11.100	13.200
t_{nom}, in.	0.204	0.293	0.384	0.471	0.560
D_i, in.	4.392	6.314	8.282	10.158	12.080
I, $in.^4$	7.792	33.25	98.33	222.5	445.0
M, in. lbs.	2,597.0	7,709.0	17,384.0	32,072.0	53,939.0
R_b, in. (min)	1,200.0	1,725.0	2,263.0	2,775.0	3,300.0
R_b, ft. (min)	100.0	144.0	189.0	231.0	275.0
β degrees	11.5	8.0	6.0	5.0	4.2
α degrees	5.7	4.0	3.0	2.5	2.1
A, in.	24.0	17.0	12.0	11.0	9.0
P, lbs.	20.0	50.0	100.0	210.0	350.0
Ratio R_b/D_o	250.0	250.0	250.0	250.0	250.0

Assuming that the bent length of pipe conforms to a circular arc after backfilling and installation, (Figure 7), the minimum radius of the bending circle R_b can be found by Timoshenko's equation:

$$R_b = \frac{EI}{M'} \text{ in.} \qquad \textit{Eq 20}$$

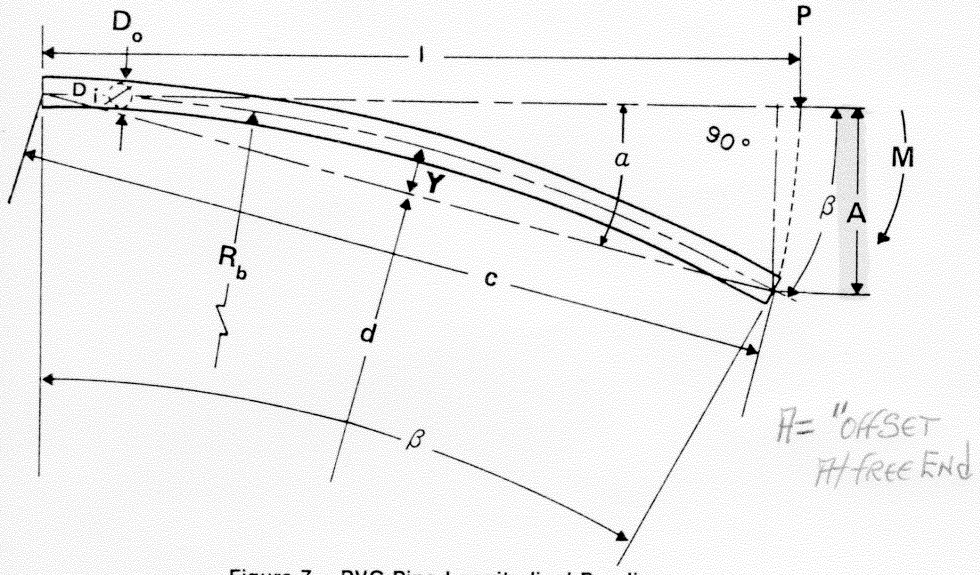


Figure 7. PVC Pipe Longitudinal Bending

Combining Equations 18 and 20 gives

$$R_b = \frac{ED_o}{2S_b} \qquad \textit{Eq 21}$$

The central angle β subtended by the length of pipe is

$$\beta = \frac{360L}{2\pi R_b} = \frac{57.30L}{R_b} \qquad \textit{Eq 22}$$

Where:
L = Pipe length, in.
R_b = Minimum bending radius, in.
M = Bending moment in. lb
E = Modulus of tensile elasticity, psi
S_b = Allowable bending stress, psi

L and R_b are both in the same units, and the angle of lateral deflection (α) of the curved pipe from a tangent to the circle is:

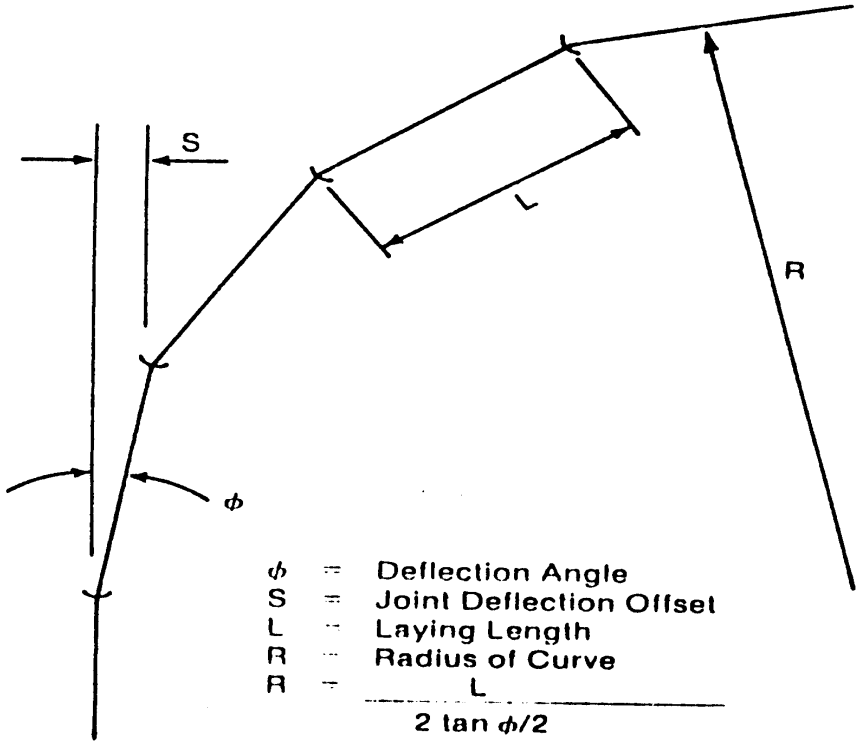


Figure 4. Pipeline Curve Geometry

TABLE 5

Maximum Joint Deflection Full-Length Pipe—Mechanical-Joint Pipe DI

Nominal Pipe Size *in.*	Deflection Angle—θ *deg*	Maximum Offset—S^* *in. (m)* 18 ft (5.5 m) L^*		Approx. Radius of Curve—R^* Produced by Succession of Joints *ft (m)* 18 ft (5.5 m) L^*	
4	8-18	31	(0.79)	125	(38)
6	7-07	27	(0.69)	125	(38)
8	5-21	20	(0.51)	145	(44)
10	5-21	20	(0.51)	195	(59)
12	5-21	20	(0.51)	195	(59)
16	3-35	13½	(0.34)	285	(87)
18	3-00	11	(0.28)	340	(104)
20	3-00	11	(0.28)	340	(104)
24	2-23	9	(0.23)	450	(137)
30	2-23	9	(0.23)	450	(137)
36	2-05	8	(0.20)	500	(152)
42	2-00	7½	(0.19)	510	(155)
48	2-00	7½	(0.19)	510	(155)

*See Figure 4.